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10/506,913	04/26/2005	Leif Wilhelmsson	P15096US2	6784

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/506,913	WILHELMSSON ET AL.
	Examiner	Art Unit	
	Rahel Guarino	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

    4a) Of the above claim(s) *2,3,6,9,13,16,17,20 and 22-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,5,7,8,10-12,14,15,18,19 and 31-34,37-42* is/are rejected.

7)☒ Claim(s) *21,35 and 36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on *03 September 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

1.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2.   The abstract of the disclosure is objected to because **it is over 150 words**.

Correction is required. See MPEP § 608.01(b).

Content of Specification

(a)   <u>Title of the Invention</u>: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.

(b)   <u>Cross-References to Related Applications</u>: See 37 CFR 1.78 and MPEP § 201.11.

(c)   <u>Statement Regarding Federally Sponsored Research and Development</u>: See MPEP § 310.

(d)   The Names Of The Parties To A Joint Research Agreement: See 37 CFR
       1.71(g).

(e)   Incorporation-By-Reference Of Material Submitted On a Compact Disc:
       The specification is required to include an incorporation-by-reference of
       electronic documents that are to become part of the permanent United
       States Patent and Trademark Office records in the file of a patent
       application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer
       program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)),
       and tables having more than 50 pages of text were permitted as electronic
       documents on compact discs beginning on September 8, 2000.

(f)   Background of the Invention: See MPEP § 608.01(c). The specification
       should set forth the Background of the Invention in two parts:

       (1)   Field of the Invention: A statement of the field of art to which the
              invention pertains. This statement may include a paraphrasing of
              the applicable U.S. patent classification definitions of the subject
              matter of the claimed invention. This item may also be titled
              "Technical Field."

       (2)   Description of the Related Art including information disclosed under
              37 CFR 1.97 and 37 CFR 1.98: A description of the related art
              known to the applicant and including, if applicable, references to
              specific related art and problems involved in the prior art which are
              solved by the applicant's invention. This item may also be titled
              "Background Art."

(g)   Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary
       or general statement of the invention as set forth in 37 CFR 1.73. The
       summary is separate and distinct from the abstract and is directed toward
       the invention rather than the disclosure as a whole. The summary may
       point out the advantages of the invention or how it solves problems
       previously existent in the prior art (and preferably indicated in the
       Background of the Invention). In chemical cases it should point out in
       general terms the utility of the invention. If possible, the nature and gist of
       the invention or the inventive concept should be set forth. Objects of the
       invention should be treated briefly and only to the extent that they
       contribute to an understanding of the invention.

(h)   Brief Description of the Several Views of the Drawing(s): See MPEP §
       608.01(f). A reference to and brief description of the drawing(s) as set
       forth in 37 CFR 1.74.

(i) <u>Detailed Description of the Invention</u>: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.

(j) <u>Claim or Claims</u>: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).

(k) <u>Abstract of the Disclosure</u>: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

(l) <u>Sequence Listing.</u> See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

Claim Objections

3. Claim 7 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claims 1, 4 and 5. See MPEP § 608.01(n).

4.   Claim 8 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 1, 4,5,31 and 32. See MPEP § 608.01(n).

5.   Claim 10 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 1, 4,5,31 and 32. See MPEP § 608.01(n).

6.   Claim 11 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 1, 4,5,31 and 32. See MPEP· § 608.01(n).

7.   Claim 14 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 1, 4,5,31 and 32. See MPEP § 608.01(n).

8.   Claim 33 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 1, 4,5,31 and 32. See MPEP § 608.01(n).

9.   Claim 37 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 34 through 36. See MPEP § 608.01(n).

10.   Claim 38 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 34 through 36. See MPEP § 608.01(n).

11.   Claim 40 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 34 through 36. See MPEP § 608.01(n).

12.   Claim 21 is objected to under 37 CFR 1.75(c) as being in improper form because

a multiple dependent claims 34 through 36 and also for depending on **cancelled claims**

16, 17 and 20 have been cancelled.

See MPEP § 608.01(n).

13.   Appropriate correction is required.

Claim Rejections - 35 USC § 101

14.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1 and 31 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The recitation of this method is categorized as a process and as such covers/includes the judicial exception of an abstract idea, where the claimed invention is seemingly a patentable process or apparatus, however it is in reality seeking patent protection of a math algorithm. Although, there is no practical application by physical transformation, the questions arises is there practical application that produces useful and tangible result? The answer is no; the focus is on the _result_, not the steps or structure used to produce the result. The body of the method as claimed simply recites generating a reliability value from a received multilevel signal and for this reason does not produce a tangible result. Conclusion – non statutory; correction is required.

Claims 4, 5, 7,8,10 11 12 and 14 are rejected for to as being dependent upon a rejected base claim.

Claims 32 and 33 are rejected for to as being dependent upon a rejected base claim..

Claim Rejections - 35 USC § 103

15.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16.   Claims 1,8,10,14,15, are rejected under 35 U.S.C. 103(a) as being unpatentable over kandala et al. US 6,977,972.

Re claim 1, Kandala discloses a method of generating a reliability value from a received multilevel signal in relation to a number of predetermined signal symbols each associated with a corresponding bit sequence including a first bit position, the soft value being indicative of a reliability value for the first bit position, the method comprising (fig.2; col. 3 lines 25-30):

identifying a first one of the number of signal symbols as being closest to the received multilevel signal (col. 3 lines 7-10); estimating the soft value as a function of a first distance between the received signal and the first signal symbol (col. 7 lines 39-43) and of a second distance between the received signal (col. 8 lines 55-59) and a second one of the number of signal symbols that is closest to the first signal symbol and corresponds to a different binary value at the first bit position of the respective associated bit sequence than the first signal symbol (col. 6 lines 30-37); and wherein estimating the soft value comprises estimating the second distance by a stored third distance between the first signal symbol and the second signal symbol (col. 5 lines 55-66), does not explicitly teach storing the third distance.

Instead, Kandala teaches identifying and storing each set of the neighborhood

defining the vectors in the signal constellation proximate.

Therefore, it would have been rendered obvious to one skilled in the art to

store each set of the neighborhood defining the vectors for the benefit of setting a

predetermined range for the measure of reliability.

Re claim 8, the method according to any one of the claims 1, wherein the method

further comprises the step of providing the soft value as an input to a decoder (col. 4

lines 41-46 and fig. 1 (decoder (32)); the multilevel soft decision is forwarded to the

decoder).

Re claim 10, the method according to any one of the claims 1, wherein the soft

value is calculated as a log-likelihood ratio (fig.4 and col. 8 lines 30-45; fig.4 shows the

log-likelihood ratio calculation for 8-PAM symbol).

Re claim 14, the method according to claim 1, wherein the number of signal

symbols are associated with the number of bit sequences such that the bit sequences

associated with all nearest neighbours of each signal symbol only differ from the bit

sequence of that signal symbol at one bit position (col. 3 lines 6-11).

Re claim 15, Kandala discloses a device for generating a soft value from a

received multilevel signal in relation to a number of predetermined signal symbols each

associated with a corresponding bit sequence including a first bit position, the soft value

being indicative of a reliability value for the first bit position (fig.1 24 (receiver)) , the

device comprising:

processing means adapted to identify a first one of the number of signal symbols as

being closest to the received multilevel signal (col. 3 lines 7-10); and

estimate the soft value as a function of a first distance between the received signal and

the first signal symbol (col. 7 lines 39-43) and of a second distance between the

received signal and a second one of the number of signal symbols (col. 8 lines 55-59),

that is closest to the first signal symbol and corresponds to a different binary value at

the first bit position of the respective associated bit sequence than the first signal

symbol(col. 6 lines 30-37); storage means adapted to store a third distance between

the first signal symbol and the second signal symbol(col. 5 lines 55-66); and wherein the

processing means is further adapted to estimate the second distance by the stored third

distance (col. 5 lines 55-66), does not explicitly teach storing the third distance.

Instead, Kandala teaches identifying and storing each set of the neighborhood

defining the vectors in the signal constellation proximate.

Therefore, it would have been rendered obvious to one skilled in the art to

store each set of the neighborhood defining the vectors for the benefit of setting a

predetermined range for the measure of reliability.

17.   Claim 4, 5, 11,12,19,18,31,34,37-42 are rejected under 35 U.S.C. 103(a) as

being unpatentable over kandala et al. US 6,977,972 in view of Gerlach et al.

US, 6,499,128.

Re claim 4, the method according to claim 1, does not disclose estimating the

soft value comprises the step of determining a polynomial function of the first distance

and the second distance, wherein the polynomial function is multiplied by a

predetermined constant (K).

However, Gerlach discloses wherein the step of estimating the soft value

comprises the step of determining a polynomial function of the first distance and the

second distance, wherein the polynomial function is multiplied by a predetermined

constant (K) (col. 10 lines 10-16).

Therefore, it would have been rendered obvious to one skilled in the art to

Modify kandala to utilize determining a polynomial function with predetermined constant

for the benefit of estimating the symbol values.

Re claim 5, the modified invention as claimed in claim 4, wherein the

predetermined constant is selected depending on the noise distribution of the received

multilevel signal (col. 9 lines 45-50,"Gerlach").

Re claim 11, the modified invention as claimed in claim 4, wherein the step of

identifying the first signal symbol as being closest to the received multilevel signal

comprises the step of identifying the first signal symbol as being closest to the received

multilevel signal with respect to a Euclidean distance measure in a signal space (fig. 8;

col. 8 lines 60-65;"Gerlach").

Re claim 12, the modified invention as claimed in claim 11, wherein the signal

space is related to the complex plane in quadrature amplitude modulation (fig.2; col. 4

lines 24-27; fig.2 shows the signal constellation for 16-QAM,"Kandala").

Re claim 18, the device according to claim 15, does not disclose processing

means is further adapted to determine a polynomial function of the first distance and the

second distance, wherein the polynomial function is multiplied by a predetermined

constant (K).

However, Gerlach discloses processing is further adapted to determine a

polynomial function of the first distance and the second distance, wherein the

polynomial function is multiplied by a predetermined constant (col. 10 lines 10-16).

Therefore, it would have been rendered obvious to one skilled in the art to

Modify kandala to utilize determining a polynomial function with predetermined constant

for the benefit of estimating the symbol values.

Re claim 19, the modified invention as claimed in claim 18, wherein the

predetermined constant is selected depending on the noise distribution of the received

multilevel signal (col. 9 lines 45-50,"Gerlach").

Re claim 31, Kandala discloses method of generating a soft value from a

received multilevel signal in relation to a number of predetermined signal symbols each

associated with a corresponding bit sequence including a first bit position, the soft value

being indicative of a reliability value for the first bit position, the method comprising

(fig.1 (24)):

 identifying a first one of the number of signal symbols as being closest to the received

multilevel signal (col. 3 lines 7-10); estimating the soft value as a function of a first

distance between the received signal and the first signal symbol (col. 7 lines 39-43) and

of a second distance between the received signal (col. 8 lines 55-59) and a second one

of the number of signal symbols that is closest to the first signal symbol and

corresponds to a different binary value at the first bit position of the respective

associated bit sequence than the first signal symbol (col. 6 lines 30-37); and

wherein estimating the soft value further comprises the step of selecting, dependent on

the first signal symbol and the first bit position (col. 3 lines 7-10), does not teach

selecting dependent one of a number of stored functional relations between the

received multilevel signal and the soft value.

However, Gerlach discloses selecting dependent one of a number of stored

functional relations between the received multilevel signal and the soft value (col. 8

Lines 31-45).

Therefore, it would have been rendered obvious to one skilled in the art to

Modify kandala to select based on one of a number of stored functional relations

between the received multilevel signal and the soft value for the benefit of initial

estimate of individual symbols.

Re claim 34, Kandala discloses a device for generating a soft value from a

received multilevel signal in relation to a number of predetermined signal symbols each

associated with a corresponding bit sequence including a first bit position, the soft value

being indicative of a reliability value for the first bit position (fig.2; col. 3 lines 25-30), the

device comprising:

processing means adapted to identify a first one of the number of signal symbols as

being closest to the received multilevel signal(col. 3 lines 7-10); and estimate the soft

value as a function of a first distance between the received signal and the first signal

symbol (col. 7 lines 39-43) and of a second distance between the received signal (col. 8

lines 55-59) and a second one of the number of signal symbols that is closest to the first

signal symbol and corresponds to a different binary value at the first bit position of the

respective associated bit sequence than the first signal symbol (col. 6 lines 30-37);

does not teach selecting dependent one of a number of stored functional relations

between the received multilevel signal and the soft value.

However, Gerlach discloses selecting dependent one of a number of storage

functional relations between the received multilevel signal and the soft value (col. 8

Lines 31-45).

Therefore, it would have been rendered obvious to one skilled in the art to

Modify kandala to select based on one of a number of storage functional relations

between the received multilevel signal and the soft value for the benefit of initial

estimate of individual symbols.

Re claim 37, the modified invention as claimed in claim 34, wherein the soft value

is adapted to calculate as a log-likelihood ratio (fig.4 and col. 8 lines 30-45; fig.4 shows

the log-likelihood ratio calculation for 8-PAM symbol).

Re claim 38, the modified invention as claimed in claim 34, does not disclose

wherein the processing means is further adapted to identify the first signal symbol as

being closest to the received multilevel signal with respect to a Euclidean distances in a

signal space.

However, Gerlach discloses processing is further adapted to identify the first

signal symbol as being closest to the received multilevel signal with respect to a

Euclidean distances in a signal space (fig.7, fig.8, col. 8 lines 56-65).

Therefore, it would have been rendered obvious to one skilled in the art to Modify kandala to identify the first signal symbol as being closest to the received multilevel signal with respect to a Euclidean distances in a signal space for the benefit of estimating individual bits based on received estimate values.

Re claim 39, the modified invention as claimed in claim 38, wherein the signal space is related to the complex plane in quadrature amplitude modulation (fig.2; col. 4 lines 24-27; fig.2 shows the signal constellation for 16-QAM,"Kandala").

Re claim 40, the modified invention as claimed in claims 34, wherein the number of signal symbols are associated with the number of bit sequences such that the bit sequences associated with all nearest neighbours of each signal symbol only differ from the bit sequence of that signal symbol at one bit position (col. 3 lines 6-11).

Re claim 41, the modified invention as claimed in claim 34, wherein the device further comprises a decoder adapted to receive an input signal from the arrangement indicative of the determined soft value (col. 4 lines 41-46 and fig. 1 (decoder (32)); the multilevel soft decision is forwarded to the decoder).

Re claim 42, the modified invention as claimed in claim 34, wherein the device is

operable as a mobile terminal (fig. 9;"Kandala").

Allowable Subject Matter

18.   Claim 21, 35,36 are objected to as being dependent upon a rejected base claim,

but would be allowable if rewritten in independent form including all of the limitations of

the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Rahel Guarino whose telephone number is 571-270-

1198. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Payne David can be reached on 571-272-3024. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RG

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